Project Introduction

Shape Change Technologies (SCT) has pioneered the use of Self-propagating High Temperature Synthesis (SHS) to manufacture open celled, porous TiNi. Recently, we have been able to demonstrate the shape memory effect in these foams, which is a unique capability. Unlike solid, monolithic TiNi, the open-celled foam structure allows for very rapid response times when immersed in fluids, such as hot water or hot air. The SHS process makes net shape components, and so the cost of the tube can be dramatically reduced, and can have features introduced into the end of the tube to allow for simple torque transfer into a structure. Thus, in developing a foam torque tube using SHS, all of the key obstacles to its incorporation into existing aerostructures can be resolved, while preserving the key benefits of a lightweight, solid-state structure.

Primary U.S. Work Locations and Key Partners

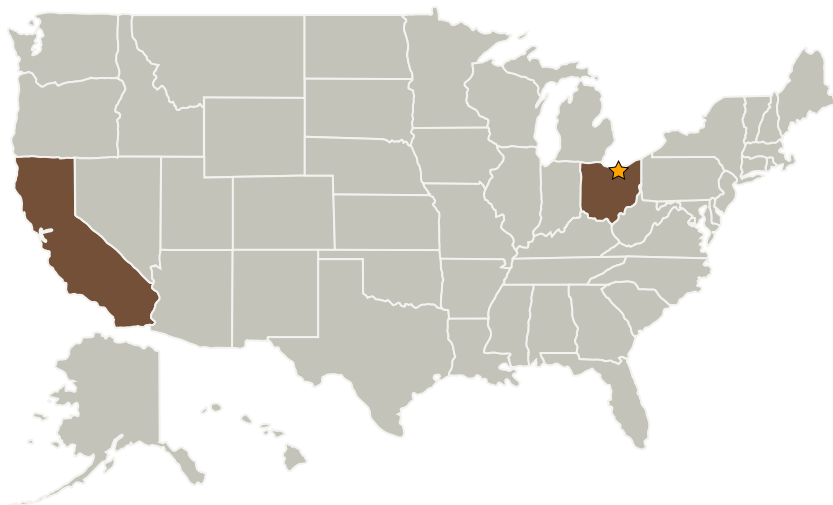| Organizations Performing Work	Role	Type	Location
⭐Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Shape Change Technologies	Supporting Organization	Industry	Thousand Oaks, California

Development of Fast Response SME TiNi Foam Torque Tubes, Phase I

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Primary U.S. Work Locations	
California	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  └ TX12.1 Materials
    └ TX12.1.8 Smart Materials